

in view of Barca. Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

clm 10  
As explained previously, the instant invention is directed to a method of clamping a threaded cap onto a threaded vessel which comprises the steps of providing the cap and the vessel with the threads of the vessel having a predetermined winding angle adapted to a gauge with the threads of the cap, a capping head for holding the cap and a motor for rotating the capping head in the clamping direction. A change in the force acting on the cap is measured as distal ends of the threads on the cap in the vessel contact with each other during relative rotation of both threads and an incipient position of a meshing engagement where the distal ends of both threads first contact with each other is detected on the basis of the change in the acting force.

clm 16  
Another embodiment of the present invention is directed to a capping apparatus for performing the claimed clamping method. The apparatus comprises a capping head for holding a cap having threads, a motor for rotating the capping head in a clamping direction in order to clamp the cap onto a vessel having threads with a predetermined winding angle adapted to engage with the threads of the cap, an elevating mechanism for raising the capping head up and down, measuring means for measuring a change in a force acting on the cap which is held by the capping head, angle detecting means for detecting an angular position to which the capping head is rotated and control means for causing the capping head to rotate forwardly or reversibly with respect to the clamping direction during the course of the descent of the capping head to an elevation where a clamping of the cap is to be initiated, measuring a change in a force acting on the cap at its distal ends of the threads on the cap and the vessel contact each other during relative rotation of both threads and detecting an incipient position of a meshing engagement where the distal ends of both

claim 1 threads first contact each other on the basis of the change in the acting force.

In the present invention, the cap and a vessel to be capped are rotated in a relative counter direction in a state such that the threads of the cap and threads of the vessel are not engaging. An operating force acting on the cap as the distal ends of the threads of the cap and vessel first contact each other is detected so that an incipient position of the meshing engagement where the distal ends of both threads first contact each other is determined. The cap is then rotated in a clamping direction by a predetermined angle based on the incipient position of the meshing engagement where the distal ends of both threads first contact each other, thereby clamping the cap onto the vessel. With the present invention, the precise incipient position of the meshing engagement of the distal ends of the threads of the cap and the threads of the vessel first contact each other can be detected independent of the influence of temperature or humidity. The present invention also allows for the cap to be attached to the vessel based on the incipient position of the meshing engagement so that the tightness of the cap can be constant after it is attached to the vessel since the cap is turned through a given angle of rotation based on the initial contact position. This provides for uniformly clamping of all caps supplied to the vessels. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention. Argument

As discussed previously, the Spatz et al reference is directed to a slewing device for screw closures for containers and comprises a screw closure receiving member, a drive for rotating the receiving member, and a control arrangement for controlling power supplied to the drive and including a torque sensor for sensing an instantaneous drive torque, a comparator for comparing the instantaneous drive torque with a closing torque having a predetermined value, and a sensor for sensing

an angle of rotation of the receiving member and actuatable only upon the instantaneous drive torque reaching the predetermined value. In Spatz et al, the screw closure is screwed down until it reaches a predetermined closing moment and, thereafter, an angle of rotation and/or a chronological change is determined. The incipient position in Spatz occurs at a time in which a predetermined closing moment is reached. In column 2, lines 27-30, this reference states that the screw closure is screwed down until this predetermined closing moment is obtained. In the present invention, the incipient position occurs where the distal ends of the threads on the cap and the bottle first contact each other and before any "screwing on" occurs. Therefore, it is respectfully submitted that Spatz et al does not disclose the claimed method in which the incipient position is at a point in time when the distal ends of the threads of a cap and a vessel first contact each other or the claimed capping apparatus which requires a control means for detecting an incipient position of a meshing engagement where the distal ends of both threads first contact each other on the basis of a change in the acting force.

*not so specifically claimed*

The Humphries et al reference has been cited by the Examiner as disclosing thread disengagement by rotating a cap in an unscrewing sense for the purpose of disengaging the screw head from the cap and Barca has been cited as teaching the measurement of the actual load on the cap and the use of an adaptor to rotate the screw head in a clamping direction while descending the cap toward the container in order to minimize the creation of particulate matter. However, none of these references cure the primary defects of the primary Spatz et al reference in that they would not provide the motivation to one of ordinary skill in the art to modify the process and apparatus of Spatz to change the incipient position from a position where a predetermined detection torque is determined after the threading of the cap on a bottle to the incipient position of the present invention where the threads first come

into contact with each other. Therefore, it is respectfully submitted that the presently claimed invention clearly is patentably distinguishable over the prior art cited by the Examiner.

The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,

  
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136.0112



Received the following Patent Application:

Applicant: Hiroaki KITAMOTO  
Title: CAPPING METHOD AND APPARATUS  
Serial No.: Unknown  
Filing Date: Unknown  
Pages of: Specification 22, Claims 4  
Sheets of Drawings: 8  
Declaration: Enclosed  
Filing Fee: \$710.00 ( ☒ Check ☐ Deposit Acct )  
Other: Assignment and Transmittal therefor  
Preliminary Amendment Canceling Claims  
Information Disclosure Statement  
including Form PTO-1449 and one  
copy of each reference listed thereon  
Certified Copy of Japanese Application  
No. 2000-060594, filed March 6, 2000  
Our Ref: Kanzaki Case 161  
Express Mail Cert. (Label No. EL 640 011 728 US)  
Due: March 6, 2001

